FS-GF801
User’s Manual

Favite Inc.

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CHAPTER 1

Introduction

This Hardware Setup Guide provides instructions for installing and operating the FS-GF801 RFID Readers.
This document is designed for use by RFID system integrators and software developers - those who wish to develop software products and extended systems that take full advantage of the RFID Reader's capabilities.
Included with each reader or developer kit are the Favite RFID Reader Software Developer's Kit and User Documentation CD-ROM.

RFID Reader Overview

FS-GF801, one of FAVITE RFID reader family, is an Intel ATOM CPU based smart reader. The FS-GM801 is embedded with Impinj R2000 chip and compliant with EPC Class1 Gen2 Dense Reader mode (DRM) / ISO 18000-6C. The FS-GF801 is equipped with 8 SMA RF antenna ports which could support 8 mono-static antennas or 4 pairs of bi-static antennas, providing support for the richest enterprise applications. With the powerful combination of an Intel ATOM N270 1.6GHz CPU and up to 1GB memory, the FS-GF801 is the smartest RFID reader available, capable of running complex RFID applications, delivering faster processing and localized intelligence. The RFID Reader is delivered with the following components and accessories:

- One(1)RFID Smart Reader.
- One (1) power supply and cord.
- Favite RFID Reader Software Developer's Kit and User Documentation CD-ROM.
- Windows XP embedded operation system(optional).

EPC Class 1 UHF RFID Tags

The Favite FS-GF801 RFID reader is designed to read and program any EPC Class 1 Generation 2 tag (see below) and issue event reports to a host computer system. The reader is also designed to read and program Class 1 Generation 2 tags. Class 1 Generation 2 tags are "passive" devices meaning they do not have a battery or other onboard power source. They are powered solely by the RF energy transmitted by an RFID reader.
They communicate with the reader through backscatter modulation in which the tags do not actually transmit RF energy. Instead, they change their reflective characteristics in a systematic way and reflect RF energy back to the reader. An analogy to this is the way you can use a mirror to transmit information by reflecting light from the Sun.
Favite Inc. manufactures user-programmable EPC Class 1 Generation 2 tags compliant with all key commercial and DoD mandates. Favite offers a variety of designs capable of delivering optimal performance worldwide, including Europe

and Asia.
For more information about RFID tags from Favite Inc., please visit our website at http://rfid.favitete.com.

Requirements

To interface with the RFID Reader you will need the following:

Standard DC 10-30V, 2.55A Power supply and cord (included with reader) Host software (Favite demo software or your own custom software implement by Favite Software Development Kit

Specifications

System	
Host Interface	(USB / UART/ RS232 / LED / Reset / Debug Port / GPIO / SAMBA / VCC in / GND)
Chipset	PHY: Impinj R2000 MAC: ATMEL AT91SAM7S-256
Operating Voltages	12.0V+/-5% or 5.0V+/-5% (option)
DC Power	12V:1.5A @ 30dBm; 5V:3A @ 30dBm
Protocol	
RFID Protocol Support	EPC Gen 2 ISO 18000-6C
Support EPC DRM	Yes (with DRM Filter) SW Switchable
RF	
Frequency	US: 902 ~ 928MHz（FHSS） EU: 865 ~ 868MHz
Demodulation	ASK or PSK
Modulation Depth	90% nominal
Data Encoding	FM0 or Miller code
Bit Rate	Supports uplink data rates of up to 640 Kbps
TX Output power	5 ~ 30dBm in 1dB step
Antenna Type	8 Port Mono-static and 4 Port Bi-static SW selectable
Antenna connector	8 SMA connectors
Regulatory and Environmental Compliance	
EMC certification	FCC 47 CFG Ch.1 Part 15 (US) ETSI EN 302 208-1 (V1.1.1) (EU)
Temperature Range	Operating: 0 ~ 55 degree C, Storage: -20 ~ 85 degree C
Humidity	10% ~ 85% Non-condensing
Software	
Driver	Windows XP / Linux Embedded
Mechanical	
Dimension	196mm x 50mm x 15mm ± 1mm

Table 1 - Specification of the FS-GF801

Mechanical: Reader Physical Size

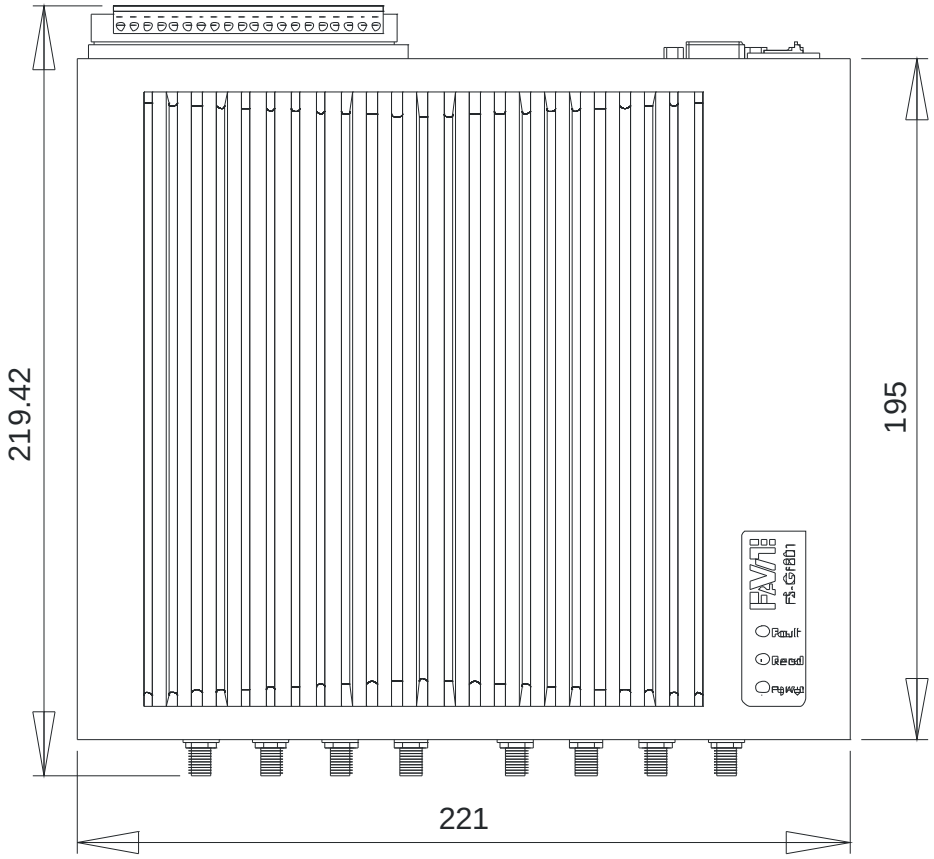

Figure 1 - Outline Drawing of the FS-GF801 (1)

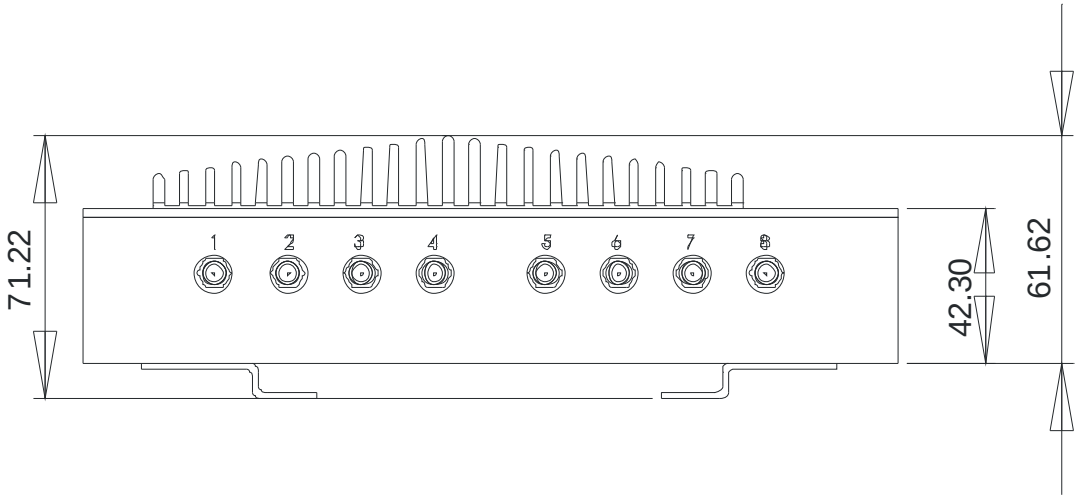

Figure 2 - Outline Drawing of the FS-GF801 (2)

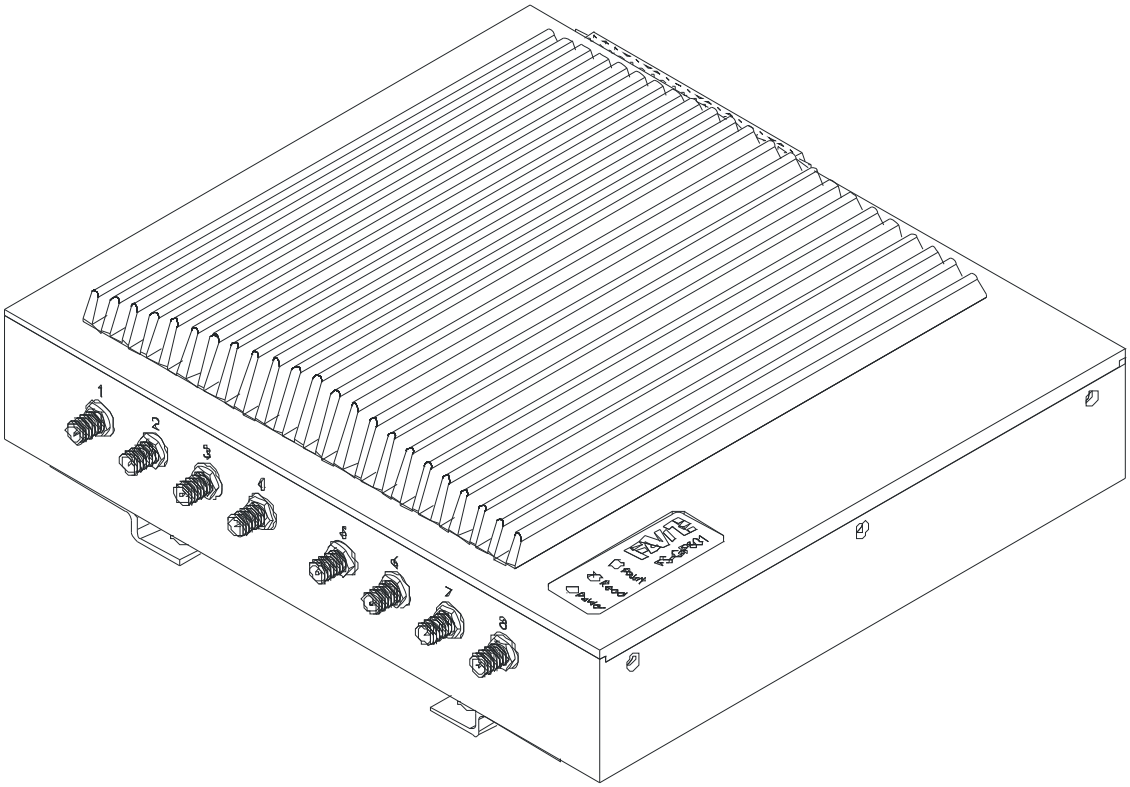

Figure 3 - Outline Drawing of the FS-GF801 (3)

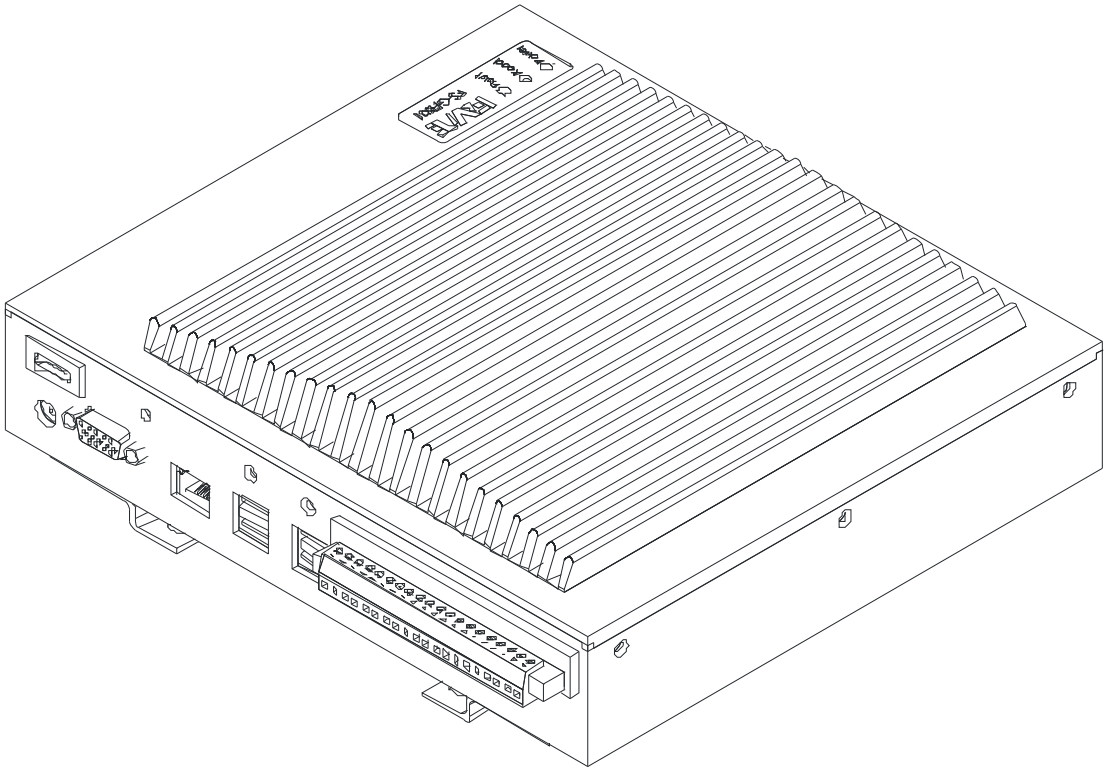

Figure 4 - Outline Drawing of the FS-GF801 (4)

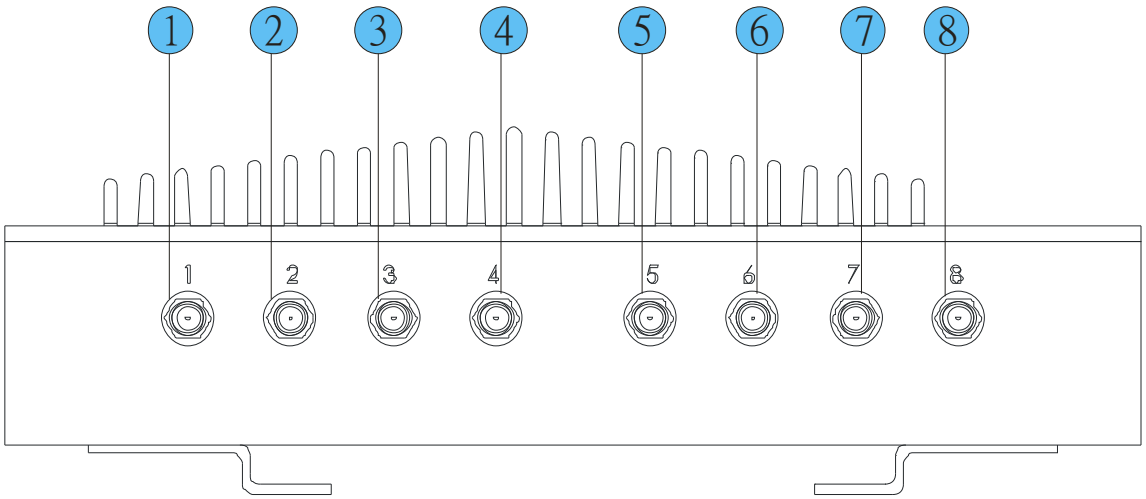

Figure 5 - Outline Drawing of the FS-GF801 Antenna Port Series

Antenna Port Terminal Interface: Mono-Static Mode

TX/RX
Port 1
Port 2
Port 3
Port 4
Port 5
Port 6
Port 7
Port 8

Table 1 – Mono-Static Mode Antenna Port definition of FS-GF801

Antenna Port Terminal Interface: Bi-Static Mode

TX	RX
Port 1	Port 5
Port 2	Port 6
Port 3	Port 7
Port 4	Port 8

Table 2 – Bi-Static Mode Antenna Port definition of FS-GF801

Reader I/O Terminal

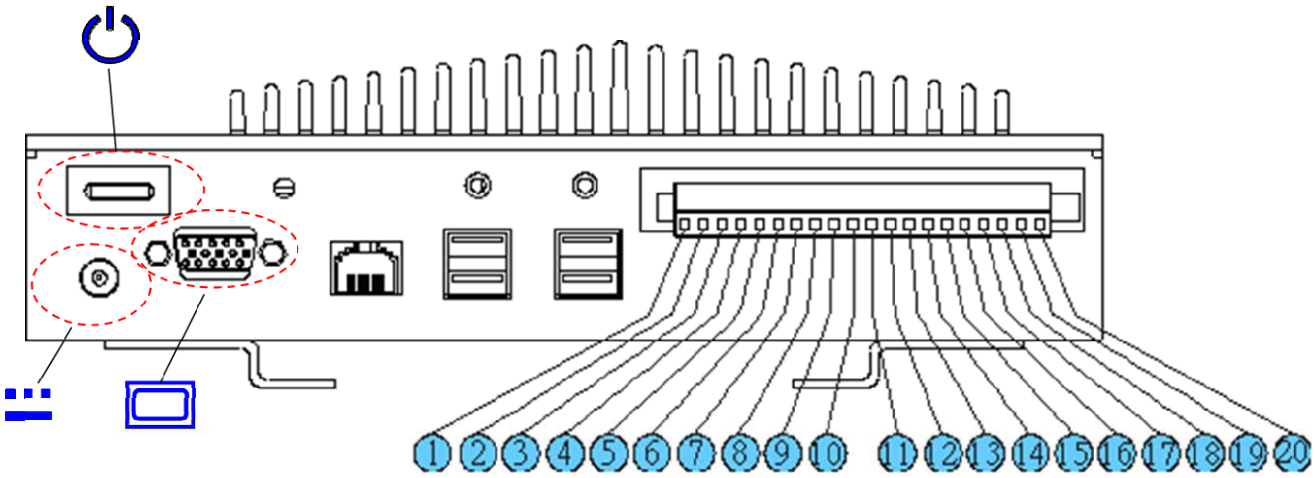

Figure 6 - FS-GF801 GPIO Pin definition and Power Supply, VGA, RJ-45, USB port description.

GPIO Port Terminal Interface

Pin 1	Signal input 1
Pin 2	Signal input 2
Pin 3	Signal input 3
Pin 4	Signal input 4
Pin 5	Signal input 5
Pin 6	Signal input 6
Pin 7	Signal input 7
Pin 8	Signal input 8
Pin 9	Signal output 1
Pin 10	Signal output 2
Pin 11	Signal output 3
Pin 12	Signal output 4
Pin 13	Signal output 5
Pin 14	Signal output 6
Pin 15	Signal output 7
Pin 16	Signal output 8
Pin 17	Ground
Pin 18	Ground
Pin 19	24 V input
Pin 20	24 V input

Table 3 – Pin definition of the GPIO

GPIO Port Terminal Circuit Diagram

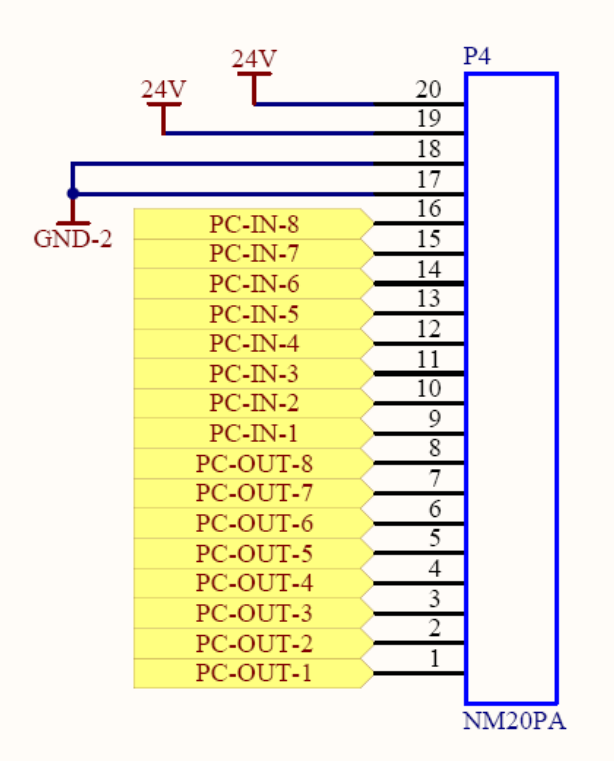

Figure 7- Circuit Diagram Pin definition

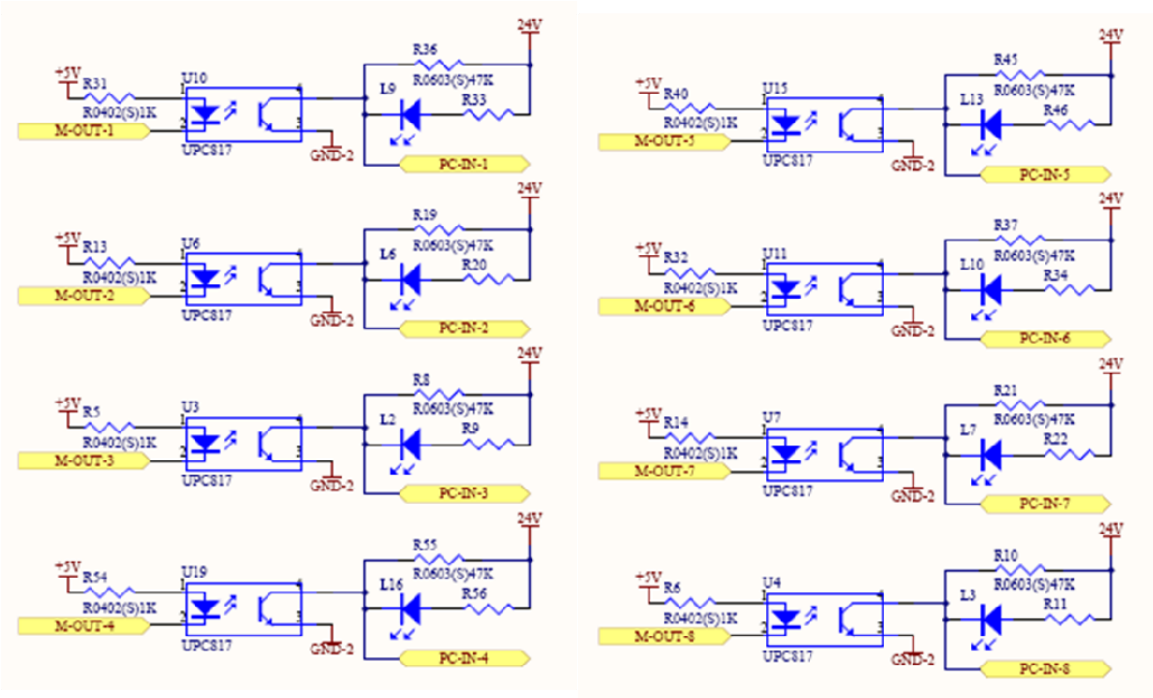

Figure 8- Circuit Diagram Pin definition of Signal output

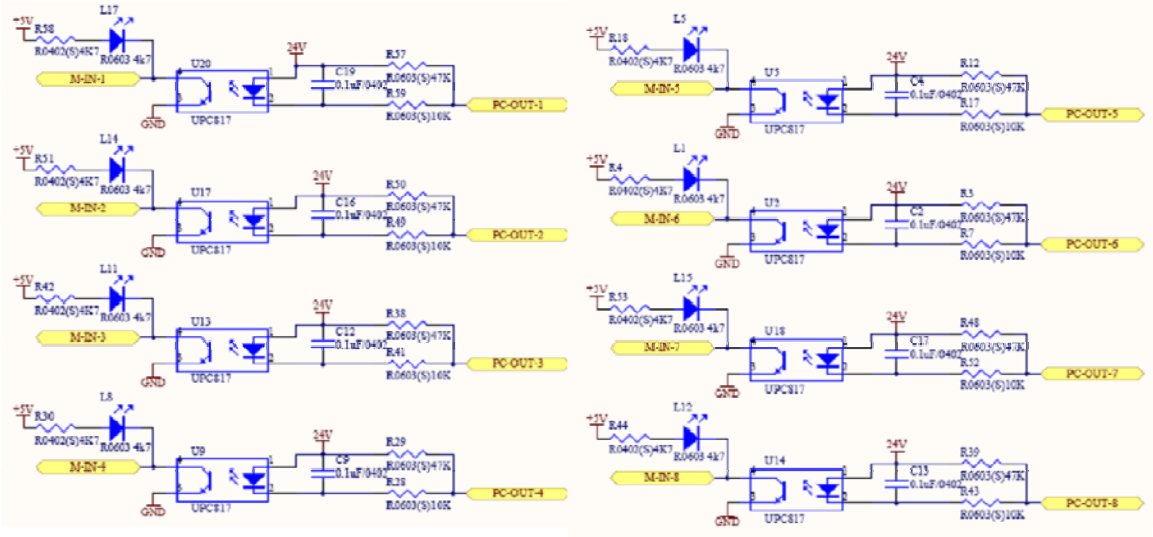

Figure 9- Circuit Diagram Pin definition of Signal input

Note.

If FS-GF801 wants to receive data from other device through GPIO, please connect 24V power source to PIN19 or PIN20 and connect the device output line to Pin 1~ Pin8.

The development of programming of receiving data from GPIO could reference the document “Specification for GM-801 GPIO API.chm” and see the session 4.6 or 4.11 to read data from GPIO with application method.

If FS-GF801 wants to transmit signal to other device, please connect to Pin 9~ Pin 16.

The programming of transmitting data to other device (like light tower) could reference the document “Specification for GM-801 GPIO API.chm” and see the session 4.8 to write data from GPIO with application method.

The device should connect to independent power source.

CHAPTER 2

Reader Hardware Installation and Operation

This chapter describes the RFID Reader and provides installation and operation information.

Receiving the RFID Reader

Your RFID Reader Kit is shipped with the items listed below. Please verify the contents of your received shipment before assembling.

- RFID Reader
- Power supply and cables (two sections: one attached, one detached)
- CD-ROM containing demonstration software, user guides and documentation

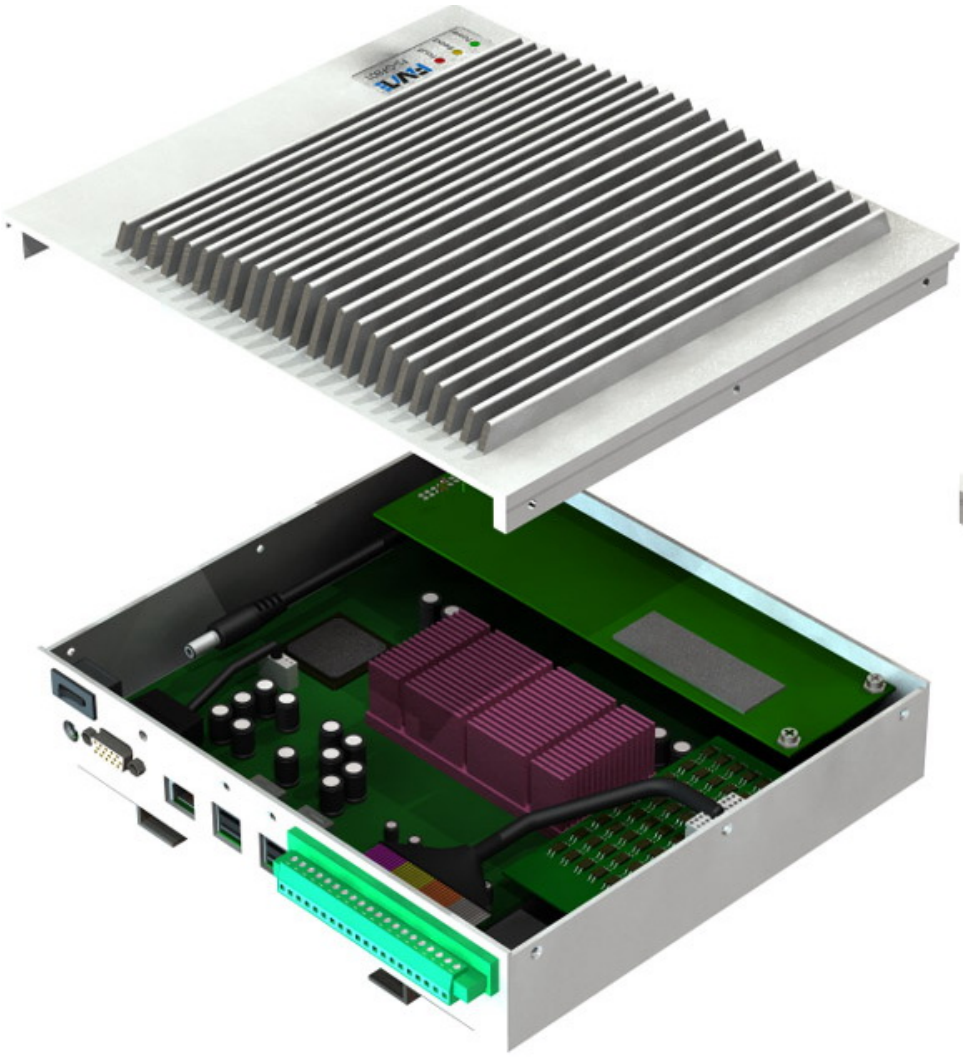

Figure 10 - FS-GF801 (1)

Figure 11 - FS-GF801 Power Supply and Adapter cable

Figure 12 - FS-GF801 Power Supply and Adapter cable

Diagnostic LEDs

The FS-GM201 includes diagnostic LEDs on the face of the reader to provide easy and convenient external indication for various operating conditions:

- **POWER (green)** – indicates power is applied to the reader.
- **Read (yellow)** – indicates that the reader is receiving data from a tag.
- **Fault (red)** – indicates a fault condition like CRC check error with the reader.

Figure 13 – FS-GF801 Reader Diagnostic LEDs

Antenna Panel

The antenna panel contains eight coax antenna connector ports as shown below. These are SMA connectors.

Figure 11 - Antenna Connections

Demonstration Software Guide

Please see the document “FAVITE_FS_GF801_Demo_API_User_Guide.doc”, “FS-GF801 GPIO Test API User Guide.doc” and “FS-GF801 DotNet CSharp API Programming Guide.doc”.